

REMARKS

Claims 1-33 are pending. Claim 1 has been amended. No new matter has been added.

Rejections under 35 U.S.C. § 112

Claims 1-33 were rejected under 35 U.S.C. § 112, first paragraph. The Office Action dated October 20, 2003 objected to the language “wherein a portion of the polymer layer is capable of an elastic area strain of at least about 10% between a first position of the polymer layer with a first area and a second position of the polymer layer with a second area”. Claim 1 has been amended to remove the objected language and now recites “wherein the polymer layer is capable of a strain of greater than 25%”. Support for compliant polymers of this nature is found throughout the specification and specific support for this amendment is found in the specification on page 5, lines 5-23, page 9, lines 31-33, and page 10, lines 16-21, for example. Applicants believe the new claim amendments do not add new matter and the rejection under 35 U.S.C. § 112 is overcome. Withdrawal of the rejection under 35 USC §112 is respectfully requested.

Double Patenting

Claims 1 and 15-18 were previously rejected for nonstatutory double patenting over commonly owned patent No 6,343,129 B1. Claim 1 has been amended and recites the limitation “wherein the polymer layer is capable of a strain of greater than 25%”. Applicant submits that claims 1 and 15-18 are patentably distinct from claims 1-2 of U.S. patent no. 6, 343, 129.

Rejections 35 U.S.C. § 103

Claims 1-3 were previously rejected under U.S.C. 103 (a) as being unpatentable over Whitehead, et al. (U.S. Patent 4,885,783).

Claims 1-6, 8-9, 13-16 were previously rejected under U.S.C. 103 (a) as being unpatentable over Micheron (U.S. patent 4,400,634) in view of Whitehead.

Claims 1-12 and 14 were previously rejected over Bobbio (U.S. patent 5, 206, 557) in view of Whitehead.

Independent claim1 now recites a limitation that is well outside the scope of the prior art. As one of skill in the art is commonly aware, strains for electroactive polymers were limited to

less than 10% until 1994. All the references pre-date this time, and therefore will not teach such strain levels as now recited in the independent claims.

The strain levels as now recited in the independent claim also cannot be reasonably construed as obvious in view of the prior art. The cited references all use solid metallic electrodes. Those skilled in the art are well aware that such solid electrodes are limited to strains less than 2-4 per cent. A solid metallic electrode deflects via elastic deformation. Deformations of metal electrodes at strains greater than the elastic allowance are plastic and lead to cracking of the planar metal and functional destruction of the electrode. Deflection at strain levels now recited in the independent claim would thus not be obvious in view of the prior art of record since such deflection of any device in the art of record would destroy the electrodes taught by the references and render the devices non-operable.

Applicants respectfully request that any further proposed rejections of the claims specifically recite how the independent claim is obvious in view of the prior art of record, particularly when the references and common skill in the art counter such an assertion.

The present invention uses significant strains, namely, greater than 25% as recited in the independent claim.

In contrast, Whitehead describes an elastomeric material sandwiched between rigid metal plates (FIG. 2) where the plates are designed to oscillate (Col. 4, 10-28). The device is designed to produce small displacements (Col. 8, 32-44). The electrodes are rigid and non-compliant (Col. 5, 29-49). In Whitehead, large strains of the elastomeric material during operation of the device are not described, and as described above, would cause the electrodes to stop working and device to be non-operable. Therefore, Whitehead can't be said to render obvious claims 1-3 and the previous rejection under 35 USC §103 no longer stands or remains applicable.

Micheron describes a biomorph transducer with polymer material sandwiched between two electrodes. The electrodes are metal (see column 6, lines 45-46) and thus not capable of strains greater than 2-4 percent without destruction. Micheron does not describe or suggest strains greater than 4%. Since strains greater than 4% would cripple the devices of Micheron, such strains are also not remotely extensible from Micheron. Figures 8 and 9 show the transducer bending but no scale is provided for one to deduce the amount of area change of the device. Conversely, Micheron specifically states the normal and tangential deformations are very small. As described above, large strains with Whitehead are also impossible and not taught or suggested. Therefore, the combination of Micheron and Whitehead cannot be said to render

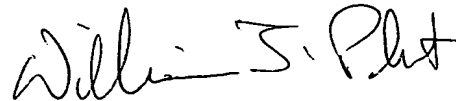
obvious the present invention and the previous rejection under 35 USC §103 for claims 1-6, 8-9, 13-16 no longer stands or remains applicable.

Bobbio describes a micro-electromechanical transducer formed from strips of a dielectric material. The device may be applied as a micropositioner (Abstract). Table 1 (Col. 11) shows that the range of control of the device is on .4 micrometers or less. Bobbio notes drawings are not to scale (Col. 7, 63-64). Large strains are not described. The device is composed of an array of strips and spaces etched from a common dielectric material (Col. 8, 35-37). During a movement of the device, a force is generated that is applied to the spacers which is of the same material as the strips. The spacers under the force output by the device elongate by only 1% or less (.01 micrometer divided by 1 micrometer) (see Col 9, 65-10, 1). Thus, area changes during the operation of the device in Bobbio are small. As described above, large strains with Whitehead are impossible and not taught or suggested. Therefore, the combination of Bobbio and Whitehead can't be said to render obvious the present invention and the previous rejection under 35 USC §103 for claims 1-12 and 14 no longer stands or remains applicable.

Conclusions

Applicant believes that all pending claims are allowable and respectfully requests early Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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Limited Recognition under 37 C.F.R. §10.9(b)

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